ENCLOSURE 1

SAFETY EVALUATION REPORT BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO THE INSERVICE TESTING PROGRAM AND REQUESTS FOR RELIEF
DUQUESNE LIGHT COMPANY
BEAVER VALLEY POWER STATION, UNIT 2
DOCKET NO.: 50-412

INTRODUCTION

The Code of Federal Regulations, 10 CFR 50.55a(g), requires that inservice testing (IST) of ASME Code Class 1, 2, and 3 pumps and valves shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable addenda, except where specific written relief has been requested by the licensee and granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). In requesting relief, the licensee must demonstrate that conformance with certain requirements of the applicable Code edition and addenda is impractical for its facility.

Regulation 10 CFR 50.55a(g)(6)(i) authorizes the Commission to grant relief from these requirements upon making the necessary findings. This Safety Evaluation Report (SER) contains the NRC staff findings with respect to granting or not granting the relief requested as part of the licensee's IST program.

The IST program addressed in this report covers the first ten-year inspection interval from November 17, 1987 to November 17, 1997. The licensee's program is described in a letter dated April 9, 1986. A revised program was submitted on April 15, 1987 and supercedes the previous submittal.

The program is based on the requirements of Section XI of the ASME Code, 1983 Edition through the Summer of 1983 Addenda and remains in effect until November 17, 1997, unless the program is modified or changed prior to the ten year interval end date.

EVALUATION

The IST program and the requests for relief from the requirements of Section XI have been reviewed by the staff with the assistance of its contractor, EG&G Idaho, Inc. (EG&G). In addition, EG&G and staff members met with licensee representatives on February 11 and 12, 1987 in a working session to discuss questions resulting from the review. The Technical Evaluation Report (TER) provided as Attachment 1 is EG&G's evaluation of the licensee's inservice testing program and relief requests. The staff has reviewed the TER and concurs with the evaluations and conclusions contained in the TER. A summary of the pump and valve relief request determinations is presented in Tables 1 and 2 respectively. The granting of relief is based upon the fulfillment of any commitments made by the licensee in its basis for each relief request and the proposed alternate testing.

Relief request RR10 is denied by this SER because the proposed alternate testing is not adequate. For an acceptable method to meet the code requirements, the licensee should refer to TER Section 4.3.2.2. Considering the burden imposed by a redundant leak test, the licensee's relief request RR1 is granted provided the conditions in TER Section 4.1.1 are met. In addition, TER Appendix C Lists the IST program anomalies which were identified during our review. The licensee should resolve these anomalies in accordance with the staff positions. Required program changes should be made within 90 days of receipt of this SER.

INSPECTION

An inspection of the Beaver Valley 2 IST program should be conducted by Region I. The inspection should focus on the adequacy of implementing procedures for the IST program, satisfactory actions to resolve the items addressed in Appendix C of the TER, and programmatic aspects of the IST program/procedures and changes to the same.

CONCLUSION

Based on the review of the licensee's IST program and relief requests, the staff concludes that the IST program as evaluated and modified by this SER will provide reasonable assurance of the operational readiness of the pumps and valves covered by the IST program to perform their safety related functions. The staff has determined that, pursuant to 10 CFR 50.55a(g)(6)(i), granting relief where the Code requirements are impractical is authorized by law and will not endanger life or property, or the common defense and security. The staff has also concluded that granting relief is otherwise in the public interest considering the burden that could result if the requirements were imposed on the facility. During the review of the licensee's inservice testing program, the staff has identified certain misinterpretations or omissions of Code requirements. These items are summarized in the TER Appendix C. The IST program for Beaver Valley 2, through submittal dated April 15, 1987, is acceptable for implementation provided that the items noted above are corrected promptly. Relief requests contained in any subsequent revisions may not be implemented without prior approval by NRC.

PRINCIPAL CONTRIBUTOR : A. Masciantonio, reviewer

DATED : March 1988

Beaver Valley Power Station, Unit 2

Table 1

Summary of Pump Relief Requests

TER Section	Section XI Requirement Subject Pump Identification	Alternate Method of Testing	Relief Action by USNRC
3.1.1	IWP-3100-1 Inlet pressure measurement Standby service water, service water, & diesel fuel oil transfer pumps	Measure pump suction fluid height	Granted
3.1.2	IWP-3100-1 Flow rate measurement Diesel fuel oil transfer pumps	Calculate flow rate with day tank level change over time	Granted
3.2.1	IWP-3400(a) Quarterly testing Residual heat removal pumps	Cold shutdown & refueling outage testing	Granted
3.2.2	IWP-3400(a) Quarterly testing Recirculation spray pumps	60 second dry pump run quarterly and refueling outage flow testing	Granted

Table 2

Summary of Valve Relief Requests

Relief Request Number	TER Section	Section XI Requirement Subject Valve Number	Alternate Method of Testing	Relief Action by USNRC
RR1	4.1.1	IWV-3420 Leak rate testing Containment isolation valves	10 CFR 50, Appendix J testing	Granted, provided applicant complies with IWV-3426 & 3427
RR2	4.1.2	IWV-3417(a) Rapid acting valve stroke time All rapid acting power operated valves	Declare inoperable if stroke time exceeds maximum value	Granted
RR3	4.2.1	IWV-3522 Full-stroke exercise 2CHS*22, 23, & 24	Full-stroke exercise during refueling outages	Granted
RR4 & RR 12	4.3.1.1	IWV-3522 Full-stroke exercise 2SIS*6, 7, 548, 550, & 552	Full-stroke exercise during refueling outages	Granted
RR11	4.3.1.2	IWV-3522 Full-stroke exercise 2SIS*545, 546, & 547	Full-stroke exercise during refueling outages	Granted
RR5, RR7, & RR9	4.3.1.3	IWV-3522 Full-stroke exercise 2SIS*27, 122, 123, 124, 125, 126, 127, 134, 135, 136, 137, 138, & 139	Full-stroke exercise during refueling outages	Granted

Relief Request Number	TER Section	Section XI Requirement Subject Valve Number	Alternate Method of Testing	Relief Action by USNRC
RR6 & RR8	4.3.2.1	IWV-3522 Full-stroke exercise 2SIS*107, 108, 109, 128 & 129	Full-stroke exercise during refueling outages	Granted
RR10	4.3.2.2	IWV-3522 Full-stroke exercise 2SIS*141, 142, 145, 147, 148, & 151	Partial-stroke exercise during refueling outages	Denied
RR13	4.4.1	IWV-3522 Verify valve closure 2CVS*93	Closure verification during refueling outage leak rate testing	Granted
RR14 & RR15	4.5.1	IWV-3522 Verify valve closure 2CPP*289, 290, 291, & 352	Closure verification during refueling outage leak rate testing	Granted
RR16	4.6.1	IWV-3522 Verify valve closure 2MSS*18, 19, 20, 196, 199 & 352	Closure verification during refueling outage leak rate testing	Granted
RR17	4.7.1	IWV-3522 Verify valve closure 2SVS*80, 81, & 82	Closure verification during refueling outage leak rate testing	Granted

Relief Request Number	TER Section	Section XI Requirement Subject Valve Number	Alternate Method of Testing	Relief Action by USNRC
RR18	4.8.1	IWV-3522 Verify valve closure 2FWS*28, 29, & 30	Closure verification during refueling outage leak rate testing	Granted
RR19	4.9.1	IWV-3522 Verify valve closure 2FWE*99, 100, & 101	Closure verification during refueling outage leak rate testing	Granted
RR20	4.10.1	IWV-3412 Full-stroke exercise 2SWS*MOV103A & MOV103B	Full-stroke exercise during refueling outages	Granted
RR21	4.10.2	IWV-3522 Full-stroke exercise 2SWS*1103 & 1104	Full-stroke exercise during refueling outages	Granted
RR22	4.11.1	IWV-3413 Stroke time measurement 2EGF*SOV202-1, SOV202-2, SOV203-1, & SOV203-2	Measure time diesel requires to acheive rated speed	Granted

EGG-NTA-7857
Revision 1

TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
BEAVER VALLEY POWER STATION, UNIT 2

Docket No. 50-412

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ABSTRACT

This EG&G Idaho, Inc., report presents the results of our evaluation of the Beaver Valley Power Station, Unit 2, Inservice Testing Program for safety-related pumps and valves.

FOREWORD

This report is supplied as part of the "Review of Pump and Valve Inservice Testing Programs for Operating License Reactors" Program being conducted for the U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Mechanical Engineering Branch, by EG&G Idaho, Inc., Mechanical Systems Evaluations.

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Docket No. 50-412

CONTENTS

TECHNICAL EVALUATION REPORT
PUMP AND VALVE INSERVICE TESTING PROGRAM
BEAVER VALLEY POWER STATION, UNIT 2

1. INTRODUCTION

Contained herein is a technical evaluation of the pump and valve inservice testing (IST) program submitted by the Duquesne Light Company for its Beaver Valley Power Station, Unit 2.

By a letter dated April 9, 1986 Duquesne Light Company submitted an IST program for Beaver Valley Power Station, Unit 2. The working session with Duquesne Light Company representatives was conducted on February 11 and 12, 1987. The licensee's revised program, as attached to J. J. Carey letter to NRC, dated April 15, 1987, which supersedes the previous submittal, was reviewed to verify compliance of proposed tests of Class 1, 2, and 3 safety related pumps and valves with the requirements of the ASME Boiler and Pressure Vessel Code (the Code), Section XI, 1983 Edition through Summer 1983 Addenda. Any IST program revisions subsequent to those noted above are not addressed in this technical evaluation report (TER). Required program changes, such as revised or additional relief requests or the deletion of any components from the IST program, should be submitted to the NRC under separate cover in order to receive prompt attention, but should not be implemented prior to review and approval by the NRC.

In their submittal Duquesne Light Company has requested relief from the ASME Code testing requirements for specific pumps and valves and these requests have been evaluated individually to determine whether they are indeed impractical. This review was performed utilizing the acceptance criteria of the Standard Review Plan, NUREG-0800, Section 3.9.6, and the Draft Regulatory Guide and Value/Impact Statement titled "Identification of Valves for Inclusion in Inservice Testing Programs". These IST Program testing requirements apply only to component testing (i.e., pumps and valves) and are not intended to provide the basis to change the licensee's current Technical Specifications for system test requirements.

Section 2 of this report presents the scope of this review.

Section 3 of this report presents the Duquesne Light Company bases for requesting relief from the Section XI requirements for the Beaver Valley Power Station, Unit 2 pump testing program and EG&G's evaluations and conclusions regarding these requests. Similar information is presented in Section 4 for the valve testing program.

Category A, B, and C valves which are exercised at cold shutdowns and refueling outages and meet the requirements of the ASME Code, Section XI, are discussed in Appendix A.

A listing of P&IDs used for this review is contained in Appendix B.

Inconsistencies and omissions in the licensee's program noted in the course of this review are listed in Appendix C. The licensee should resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

2. SCOPE

The EG&G Idaho review of the Beaver Valley Power Station, Unit 2, inservice testing program for pumps and valves was begun in September of 1986. The program initially examined was Revision 0, dated April 9, 1986, which identified the licensee's proposed testing of safety related pumps and valves in the plant systems listed in Appendix B.

To review the licensee's proposed testing of these components, they were first located and highlighted on the appropriate system P&IDs (refer to the listing of P&IDs in Appendix B of this report). After identifying the components and determining their function in the system, the proposed testing was evaluated to determine if it was in compliance with the ASME Code requirements, based on the component type and function. For pumps, it was verified that each of the seven inservice test quantities of Table IWP-3100-1 is measured or observed as appropriate. For those test quantities that are not being measured or observed quarterly in accordance with the Code, it was verified that a request for relief from the Code requirements had been submitted. If the testing is not being performed in accordance with the Code and a relief request had not been submitted, additional information was requested from the licensee to explain the inconsistency. The Request for Additional Information (RAI) document served as the agenda for the working meeting between the licensee, the NRC, and the EG&G reviewers. The relief requests were individually evaluated to determine if the licensee clearly demonstrated that compliance with the Code required testing is impractical for the identified system components, and to determine if their proposed alternate testing provides a reasonable indication of component condition and degradation. Where the licensee's technical basis or alternate testing was insufficient or unclear, the licensee was requested to supplement or clarify the relief request. The system P&ID was also examined to determine whether the instrumentation necessary to make the identified measurements is available. If, based on the unavailability of adequate instrumentation or the reviewers' experience and system knowledge, it was determined that it may not of been possible or practical to make the measurements as described by the licensee in his IST program, a question or comment was generated requesting the licensee to clarify his position.

The review of the proposed testing of valves verified that all appropriate ASME Code testing for each individual valve is performed as required. The proposed testing was evaluated to determine if all valves that were judged to be active category A, B, and/or C, (other than safety and relief valves) are exercised quarterly in accordance with IWV-3410 or 3520, as appropriate. If any active safety related valve is not full-stroke exercised quarterly as required, then the licensee's justification for the deviation, either in the form of a cold shutdown justification or a relief request, was examined to determine its accuracy and adequacy. The proposed alternate testing was also evaluated to determine if all testing is being performed that can reasonably be performed on each particular valve to bring its testing as close to compliance with the Code requirements as practical.

For valves having remote position indication, the reviewer confirmed that the valve remote position indication is verified in accordance with IWV-3300. The reviewer verified that the licensee had assigned limiting values of full-stroke times for all power operated valves in the IST program as required by IWV-3413. The assigned limits were examined to determine if they are reasonable for the size and type of valve and the type of valve operator. It was also verified that the valve full-stroke times are being measured every time that the valves are full-stroke exercised for the IST program. For valves having a fail-safe actuator, the reviewer confirmed that the valve's fail-safe actuator is tested in accordance with IWV-3415.

It was confirmed that all category A and A/C valves are leak rate tested to either the 10 CFR 50, Appendix J, and Section XI, IWV-3426 and 3427 requirements, for those valves that perform a containment isolation function, or to the Section XI, IWV-3421 through 3427 requirements for those valves that perform a pressure boundary isolation function. It was also verified that valves that perform both a containment isolation and a pressure boundary isolation function are leak rate tested to both the Appendix J and the Section XI requirements. Furthermore, if any valve appeared to perform a containment isolation and/or a pressure boundary

isolation function but was not categorized A or A/C and being leak rate tested, the licensee was asked to verify that those valves had not been categorized improperly in the IST program.

Each check valve was evaluated to determine if the licensee's proposed testing does verify the valve's ability to perform its safety related function(s). Extensive system knowledge and experience with other similar facilities were used to determine whether the proposed tests will full-stroke the check valve disks open or verify their reverse flow closure capability. If there was any doubt about the adequacy of the identified testing, questions were included in the RAI which required the licensee to address these concerns.

A further evaluation was performed on all valves in the program to determine that the identified testing could practically and safely be conducted as described. If the ability to perform the testing was in doubt, a question was formulated to alert the licensee to the suspected problem.

Safety related safety valves and relief valves, excluding those that perform only a thermal relief function, were confirmed to be included in the IST program and to be tested in accordance with IWV-3510.

After all of the valves in the licensee's IST program had been identified on the P&IDs and evaluated as described above, the P&IDs were examined closely by at least two trained and experienced reviewers to determine if any valves that may perform a safety related function were not included in the licensee's program. The licensee was asked to reconcile any valves that were identified by this process and that had been omitted from the IST program. Also, the list of systems included in the licensee's program was compared to a system list in the Draft Regulatory Guide and Value/Impact Statement titled, "Identification of Valves for Inclusion in Inservice Testing Programs". Systems that appear in the draft Regulatory Guide list but not in the licensee's program were evaluated and, if appropriate, questions were added to the RAI concerning safety related pumps and valves in those systems.

Additionally, if the reviewers suspected a specific or a general aspect of the licensee's IST program based on their past experiences, questions were written for inclusion in the RAI to clarify those areas of doubt. Some questions were included for the purpose of allowing the reviewers to make conclusive statements in this TER.

At the completion of the review, the questions and comments generated during the review were transmitted to the licensee. These questions were later used as the agenda for the working meeting with the licensee on February 11 and 12, 1987. At the meeting each question and comment was discussed in detail and resolved as follows:

a. The licensee agreed to make the necessary IST program corrections or changes that satisfied the concerns of the NRC and their reviewers.

b. The licensee provided additional information or clarification about their IST program that satisfied the concerns of the NRC and their reviewers, and no program change was required.

c. The item remained open for the licensee to further investigate and proposed a solution to the NRC.

d. The item remained open for further investigation by the NRC.

e. The item remained open for further investigation and discussion by both the NRC and the licensee.

A revised IST program dated April 15, 1987 was received and was compared to the previous submittal to identify any changes. The changes were evaluated to determine whether they were acceptable and if not, they were added to the items that remained open from the meeting. A conference call was held between the licensee, the NRC, and the reviewers to clarify the NRC positions on the open items and discuss the licensee's proposed resolutions.

This TER is based on information contained in the program submittals and on information obtained in the working meeting and conference call which took place during the review process.

3. PUMP TESTING PROGRAM

The Beaver Valley Power Station, Unit 2 IST program submitted by the Duquesne Light Company was examined to verify that all pumps that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, 1983 Edition through Summer of 1983 Addenda and the NRC positions and guidelines. The reviewers found that, except as noted in Appendix C or where specific relief from testing has been requested, these pumps are tested to the Code requirements. Each Duquesne Light Company basis for requesting relief from the pump testing requirements and the EG&G reviewer's evaluation of that request is summarized below.

3.1 Inlet Pressure and Flow Measurements

3.1.1 Relief Request

The licensee has requested relief from the inlet pressure measurement as required by Section XI, table IWP-3100-1 for standby service water pumps 21A and 21B, service water pumps 21A, 21B, and 21C, and diesel fuel oil transfer pumps 21A, 21B, 21C, and 21D. As an alternative, the licensee has proposed to calculate inlet pressure for these pumps from the height of fluid at the pumps' suctions.

3.1.1.1 Licensee's Basis for Requesting Relief. "There is no installed instrumentation to measure suction pressure for these pumps. As an alternative, suction pressure for the standby service water pumps and the service water pumps will be calculated from the intake water level indicator and the suction pressure for the diesel fuel oil transfer pumps will be calculated from the static head of the diesel generator storage tank utilizing the tank level indicating switch."

3.1.1.2 Evaluation. Since suction pressure for the standby service water pumps, service water pumps, and diesel fuel oil transfer pumps cannot be measured directly, the measurement of the height of fluid at the pumps' suction and calculation of the inlet pressure is a reasonable alternative to measuring pump inlet pressure. Because of the lack of installed suction

pressure instrumentation, compliance with the Code requirements is impractical and conformance with the Code would only be possible if these systems were substantially redesigned. Based on the determination that the Code requirements are impractical, the licensee's proposed alternative calculation of suction pressure and the burden on the licensee if the Code requirements were imposed, relief may be granted as requested.

3.1.2 Relief Request

The licensee has requested relief from the flow rate measurement as required by Section XI, table IWP-3100-1 for diesel fuel oil transfer pumps 21A, 21B, 21C, and 21D and has proposed to calculate flow rate for these pumps by measuring day tank level change over time.

3.1.2.1 Licensee's Basis for Requesting Relief. "There is no instrumentation provided to measure flow rate for these pumps. As an alternative, flow rate will be calculated by measuring the level change over time of the diesel fuel oil day tank and converting this data to diesel fuel oil transfer pump flow rate. A correction for the recirculation line will be included in the calculation."

3.1.2.2 Evaluation. Due to lack of installed instrumentation the flow rate for the diesel fuel oil transfer pumps cannot be measured directly. Calculating flow rate from the change in day tank level over time with a recirculation line correction is a reasonable alternative to measuring pump flow rate. Because of the design of this system, compliance with the Code requirements is impractical. Conformance with the Code would only be possible if the fuel oil transfer system were substantially redesigned. Based on the determination that the Code requirements are impractical, the licensee's proposed alternative measurements of the diesel fuel oil transfer pumps flow rate and the burden on the licensee if the Code requirements were imposed, relief may be granted as requested.

3.2 Test Frequency

3.2.1 Relief Request

The licensee has requested relief from the Section XI, IWP-3400(a) requirement that the residual heat removal pumps 2RHS*P21A and P21B be tested quarterly and has proposed that these pumps be tested during cold shutdowns and refueling outages.

3.2.1.1 Licensee's Basis for Requesting Relief. "Pumps are not required to be run at power or fulfill any safety function to mitigate a design basis accident. Possible overheating of the pumps could occur during pump testing on recirculation only and could compromise the system integrity. The system has no associated surge tank and the only available expansion protection is the system relief valve. Test personnel would have to make a containment entry to properly monitor pump operation. As an alternative, these pumps will tested for IWP-3100-1 quantities during cold shutdowns and refueling outages."

3.2.1.2 Evaluation. Operating the residual heat removal pumps unmonitored at power in the inaccessible containment with no associated surge tank could compromise system integrity. Because of the design of the system, compliance with the Code requirements is impractical. Conformance with the Code would only be possible if the residual heat removal system were substantially redesigned. Based on the determination that the Code requirements are impractical, the licensee's proposed alternative frequency of pump testing and the burden on the licensee if the Code requirements were imposed, relief may be granted as requested.

3.2.2 Relief Request

The licensee has requested relief from the Section XI, IWP-3400(a) requirement that the recirculation spray pumps 2RSS*P21A and P21B be tested quarterly. As an alternative, the licensee has proposed that these pumps be tested quarterly with a 60 second dry pump run and be tested during cold shutdowns and refueling outages with flow.

3.2.2.1 Licensee's Basis for Requesting Relief. During the working meeting on February 11 and 12, 1987 the licensee stated that in order to test these pumps with flow, a reservoir must be assembled and installed in containment as there is no other available suction source. The assembly and installation of this reservoir requires two or three days and can only be performed at refueling outages. Full flow testing during cold shutdown will not be done as indicated in the pump testing program.

3.2.2.2 Evaluation. As discussed during the working meeting, in order to test these pumps with flow, a reservoir must be installed in containment as a suction source for pump testing. This reservoir requires two to three days to install and is the only method that allows pump testing with flow; this also necessitates that containment be accessible. Testing recirculation spray pumps 2RSS*P21A and P21B with flow during refueling outages and quarterly dry pump runs of 60 seconds or less provides a reasonable alternative to the Code requirements. Because of the design of this system, compliance with the Code requirements is impractical. Conformance with the Code would only be possible if the recirculation spray system were substantially redesigned. Based on the determination that the Code requirements are impractical, the licensee's proposed alternative frequency for pump testing with flow and the burden on the licensee if the Code requirements were imposed, relief may be granted in accordance with this evaluation. The licensee should revise the pump testing program to reflect the actual frequency of testing.

4. VALVE TESTING PROGRAM

The Beaver Valley Power Station, Unit 2 IST program submitted by the Duquesne Light Company was examined to verify that all valves that are included in the program are subjected to the periodic tests required by the ASME Code, Section XI, 1983 Edition through Summer 1983 Addenda, and the NRC positions and guidelines. The reviewers found that, except as noted in Appendix C or where specific relief from testing has been requested, these valves are tested to the Code requirements. Each Duquesne Light Company basis for requesting relief from the valve testing requirements and the reviewer's evaluation of that request is summarized below and grouped according to system and valve category.

4.1 All Systems

4.1.1 Containment Isolation

4.1.1.1 Relief Request. The licensee has requested relief from leak testing containment isolation valves identified in table 4.1.1 (see next page of this report) in accordance with the requirements of Section XI, IWV-3420 and has proposed to verify valve operability by leak testing these valves during refueling outages in accordance with 10 CFR 50, Appendix J per station proceedures.

4.1.1.1.1 Licensee's Basis for Requesting Relief. "These containment isolation valves are leak tested in accordance with 10 CFR 50, Appendix J, Type C. Since the acceptance criteria for Appendix J, Type C testing is more limiting than ASME Section XI, additional leak testing in accordance with ASME Section XI would be redundant. As an alternative these valves will be leak tested in accordance with 10 CFR 50, Appendix J per station procedures."

4.1.1.1.2 Evaluation. Leak rate testing the containment isolation valves of table 4.1.1 in accordance with 10 CFR 50, Appendix J requirements will assure valve operability as required by the Code, however, the licensee must also comply with the requirements of Section XI, Paragraph IWV-3426 and 3427 in order to be granted this relief.

Table 4.1.1

BVPS-2 Containment Isolation Valves

2RCS*68
72
RV100
AOV101
AOV519

2CHS*HCV142
AOV200A
AOV200B
AOV200C
RV203
AOV204
MOV378
MOV381
473

2DAS*AOV100A
AOV100B
RV110

2DGS*AOV108A
AOV108B
RV115

2VRS*AOV109A1
AOV109A2

2RHS*15
RV100
107

2SIS*41
42
RV130
RV175
MOV842
AOV889

2GNS*AOV101-1
AOV101-2

2CVS*93
SOV102
151
151-1
SOV151A
SOV151B
SOV152A
SOV153A
SOV153B

2LMS*51
52

2QSS*3
4
SOV100A
SOV100B
MOV101A
MOV101B
RV101A
RV101B
267

2SSR*AOV100A-1
AOV100A-2
AOV102A-1
AOV102A-2
AOV109A-1
AOV109A-2
AOV112A-1
AOV112A-2
RV117
RV118
RV119
RV120
RV121
RV122
SOV128A-1
SOV128A-2

2SSR*SOV129A-1
SOV129A-2
SOV130A-1
SOV130A-2

2PAS*SOV105A-1
SOV105A-2

2CCP*RV102
RV103
RV104
RV105
MOV150-1
MOV150-2
MOV151-1
MOV151-2
MOV156-1
MOV156-2
MOV157-1
MOV157-2

2FNC*9
38
121
122

2SWS*RV152
MOV152-1
MOV152-2
RV153
MOV153-1
MOV153-2
RV154
MOV154-1
MOV154-2
RV155
MOV155-1
MOV155-2

2FPW*AOV204

2FPW*AOV205
AOV206
AOV221
382
388
753
761

2SAS*14
15

2IAC*22
MOV130
MOV133
MOV134

2HVR*MOD23A
MOD23B
MOD25A
MOD25B
DMP206

2HCS*SOV114A
SOV114B
SOV115A
SOV115B
MOV116
MOV117
SOV133A
SOV133B
SOV134A
SOV134B
SOV135A
SOV135B
SOV136A
SOV136B

Conformance with the Code required testing method is impractical due to system design. Based on the impracticality of complying with the Code required test method and the licensee's proposed alternative testing, relief from the Code requirements may be granted, provided the licensee also complys with the requirements of Section XI, Paragraphs IWV-3426 and 3427.

4.1.2 Rapid Acting Valves

4.1.2.1 Relief Request. The licensee has requested relief from the power operated valve stroke time trending requirements of Section XI, Paragraph IWV-3417(a), for all rapid-acting, power operated valves whose function is safety related and has proposed to apply a maximum stroke time limit of 2 seconds to all rapid-acting, power operated valves; i.e., those valves with normal stroke times of less than 2 seconds. Specific valves will be identified when preservice testing is complete.

4.1.2.1.1 Licensee's Basis for Requesting Relief. "Stroke times for rapid-acting valves are affected by variations in the response time of personnel performing the test. Therefore, trending stroke times for rapid acting valves is not practical and relief from trending these valves is requested."

4.1.2.1.2 Evaluation. The licensee has demonstrated that it is not practical to obtain accurate measurements of the stroke times for power operated valves that operated in 2 seconds or less. Variability of stroke times of rapid acting power operated valves is primarily a function of the timing method and is not a reliable indicator of valve degradation. Based on the design of these valves the staff has concluded that assigning a maximum stroke time of 2 seconds is a reasonable alternative to the Code requirements for these valves. The licensee has committed to declare these valves inoperable if the maximum stroke time is exceeded. Therefore, since the licensee's proposed alternative is a reasonable alternative to the Code requirements for providing assurance of valve operability, relief may be granted as requested.

4.2 Chemical and Volume Control System

4.2.1 Category C Valves

4.2.1.1 Relief Request. The licensee has requested relief from exercising charging pumps discharge check valves 2CHS*22, 23, and 24 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by partial-stroke exercising these valves quarterly and full-stroke exercising these valves on a refueling outage frequency.

4.2.1.1.1 Licensee's Basis for Requesting Relief. "When the reactor coolant system (RCS) is at normal operating pressure, full-stroking the discharge check valves cannot be performed because the charging pump will not develop the required flow. In addition, injection of relatively cold water will cause a thermal cycle or shock resulting in an increased probability of system failure. At cold shutdown full-stroking cannot be performed because full flow testing could result in low temperature overpressurization of the RCS. As an alternative these valves will be partial-stroke exercised quarterly and full-stroke exercised on a refueling outage frequency."

4.2.1.1.2 Evaluation. Valves 2CHS*22, 23, and 24 cannot be full-stroke exercised during power operation due to insufficient available flow of the charging pumps at normal operating RCS pressure. These valves cannot be full-stroke exercised during cold shutdown due to possible RCS low temperature overpressurization. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown, cooldown, and reactor head removal. Based on the impracticality of complying with the Code required testing frequency, and the licensee's proposed alternative testing frequency, relief from the Code requirements may be granted as requested.

4.3 Safety Injection System

4.3.1 Category C Valves

4.3.1.1 Relief Request. The licensee has requested relief from exercising low head safety injection pumps discharge check valves 2SIS*6 and 7 and high head safety injection/low head safety injection header to RCS cold legs check valves 548, 550, and 552 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.3.1.1.1 Licensee's Basis for Requesting Relief. "Normal position is closed. Safety function is to open for low head safety injection and/or high head safety injection. When the RCS is at normal operating pressure, full-stroking the header check valves and the discharge check valves cannot be performed because the low head safety injection pumps will not develop the required flow. At cold shutdown full-stroking cannot be performed because testing would require full flow injection to the RCS where there is not sufficient volume to receive the additional inventory. As an alternative these valves will be full-stroke exercised on a refueling outage frequency."

4.3.1.1.2 Evaluation. Valves 2SIS*6, 7, 548, 550, and 552 cannot be exercised during power operation because the low head safety injection pumps do not develop sufficient head to overcome RCS pressure. These valves cannot be exercised during cold shutdown due to insufficient RCS expansion volume to contain the required exercising flow. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown, cooldown, and reactor head removal. Based on the impracticality of complying with the Code required testing frequency, and the licensee's proposed alternative testing frequency, relief from the Code requirements may be granted as requested.

4.3.1.2 Relief Request. The licensee has requested relief from exercising high head safety injection/low head safety injection header to RCS hot legs check valves 2SIS*545, 546, and 547 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.3.1.2.1 Licensee's Basis for Requesting Relief. "When the RCS is at normal operating pressure, full-stroking the header check valves cannot be performed because the charging pump will not develop the required flow. In addition, injection of relatively cold water will cause a thermal cycle or shock resulting in a increased probability of system failure. At cold shutdown full-stroking cannot be performed for 2SIS*547 because full flow testing could result in low temperature overpressurization of tne RCS. Additionally, full-stroking of 2SIS*545 and 546 cannot be performed because testing would require full flow injection from low head safety injection to the RCS where there is not sufficient volume to receive the additional inventory. As an alternative these valves will be full-stroke exercised on a refueling outage frequency."

4.3.1.2.2 Evaluation. Valves 2SIS*545, 546, and 547 cannot be exercised during power operation because the charging pumps do not develop sufficient head to overcome RCS pressure. Valve 545 cannot be exercised during cold shutdown due to possible RCS low temperature overpressurization. Valves 546 and 547 cannot be exercised during cold shutdown due to insufficient RCS expansion volume to contain the required exercising flow. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown, cooldown, and reactor head removal. Based on the impracticality of complying with the Code required testing frequency, and the licensee's proposed alternative testing frequency, relief from the Code requirements may be granted as requested.

4.3.1.3 Relief Request. The licensee has requested relief from exercising high head safety injection header to RCS cold legs check valves 2SIS*134, 135, 136, 137, 138, and 139, high head safety injection header to RCS hot legs check valves 2SIS*122, 123, 124, 125, 126, and 127, and refueling water storage tank to high head safety injection pump suction check valve 2SIS*27 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.3.1.3.1 Licensee's Basis for Requesting Relief. "When the RCS is at normal operating pressure, full-stroking the header check valves and the suction check valve cannot be performed because the charging pump will not develop the required flow. In addition injection of relatively cold water will cause a thermal cycle or shock resulting in an increased probability of system failure. At cold shutdown full-stroking cannot be performed because full flow testing could result in low temperature overpressurization of the RCS. As an alternative, these valves will be full-stroke exercised on a refueling outage frequency."

4.3.1.3.2 Evaluation. Valves 2SIS*27, 122, 123, 124, 125, 126, 127, 134, 135, 136, 137, 138, and 139 cannot be exercised during power operation because the charging pumps do not develop sufficient head to overcome RCS pressure. These valves cannot be exercised during cold shutdown due to possible RCS low temperature overpressurization. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown, cooldown, and reactor head removal. Based on the impracticality of complying with the Code required testing frequency, and the licensee's proposed alternative testing frequency, relief from the Code requirements may be granted as requested.

4.3.2 Category A/C Valves

4.3.2.1 Relief Request. The licensee has requested relief from exercising low head safety injection header to RCS cold legs check valves 2SIS*107, 108, and 109 and low head safety injection header to RCS hot legs check valves 2SIS*128 and 129 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.3.2.1.1 Licensee's Basis for Requesting Relief. "Normal position is closed. Safety function is to open for low head safety injection and closed to isolate the low head safety injection system piping from the RCS during normal operation. When the RCS is at normal operating pressure, full-stroking the header check valves cannot be performed because the low head safety injection pumps will not develop the required flow to open the valve. At cold shutdown full-stroking cannot be performed because testing would require full flow injection to the RCS where there is not sufficient volume to receive the additional inventory. As an alternative these valves will be full-stroke exercised on a refueling outage frequency."

4.3.2.1.2 Evaluation. Valves 2SIS*107, 108, 109, 128 and 129 cannot be exercised during power operation because the low head safety injection pumps do not develop sufficient head to overcome RCS pressure. These valves cannot be exercised during cold shutdown due to insufficient RCS expansion volume to contain the required exercising flow. Valve closure is verified during leak rate testing. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown, cooldown, and reactor head removal. Based on the impracticality of complying with the Code required testing frequency, and the licensee's proposed alternative testing frequency, relief from the Code requirements may be granted as requested.

4.3.2.2 Relief Request. The licensee has requested relief from exercising safety injection accumulators discharge check valves 2SIS*141, 142, 145, 147, 148, and 151 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by partial-stroke exercising these valves on a refueling outage frequency.

4.3.2.2.1 Licensee's Basis for Requesting Relief. "Normal position is closed. Safety function is to open for passive low pressure injection to the RCS. When the RCS is at normal operating pressure, full-stroking accumulator discharge check valves cannot be performed because the RCS is at a higher pressure than the accumulators. At cold shutdown full-stroking cannot be performed because accumulator isolation valves are required to be closed and de-energized in accordance with Technical Specifications. In addition, at cold shutdown there is insufficient volume in the RCS to receive the additional inventory. As an alternative, these valves will be partial-stroke exercised on a refueling outage frequency."

4.3.2.2.2 Evaluation. Valves 2SIS*141, 142, 145, 147, 148, and 149 cannot be exercised during power operation since system pressure cannot overcome RCS pressure. These valves cannot be exercised during cold shutdown due to insufficient RCS expansion volume to contain the required exercising flow. The licensee's proposed alternative of partial-stroke exercising on a refueling outage frequency is not acceptable as this does not demonstrate the ability of the valves to full-stroke and thereby pass accident design flow if called upon to do so. However, these valves may be full-stroke exercised during refueling outages by sample disassembly/inspection.

The NRC staff position is that check valve disassembly/inspection using a manual full-stroke of the disk is an acceptable alternative method to verify the full-stroke capability of check valves. The sampling technique requires that each valve in the group must be of the same design (manufacturer, size, model number and materials of construction) and must have the same service conditions. Additionally, at each disassembly the licensee must verify that the disassembled valve is capable of full-stroking and that its internals are structurally sound (no loose or corroded parts).

A different valve of each group is required to be disassembled, inspected and manually full-stroked at each refueling, until the entire group has been tested. If it is found that the disassembled valve's full-stroke capability is in question, the remainder of the valves in that group must also be disassembled, inspected, and manually full-stroked at the same outage.

Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly shutdown, cooldown, and valve disassembly. Based on the impracticality of complying with the Code required testing method and the burden to the licensee of complying with the Code required testing frequency, relief from the Code requirements may be granted provided the licensee agrees to and implements check valve sample disassembly/inspection, as described above.

4.4 Containment Vacuum System

4.4.1 Category A/C Valves

4.4.1.1 Relief Request. The licensee has requested relief from exercising containment vacuum radiation monitor pump discharge header check valve 2CVS*93 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of this valve, the safety position, at a refueling outage frequency when it is leak rate tested.

4.4.1.1.1 Licensee's Basis for Requesting Relief. "Valve is normally open; safety function is closed for containment isolation. Full-stroking closed cannot be performed during normal operation because this valve is located inside containment and is inaccessible. In addition, leak testing is required to verify closure of this valve, and if attempted at cold shutdown could delay plant startup. As an alternative, this valve will be leak rate tested and verified closed on a refueling outage frequency."

4.4.1.1.2 Evaluation. Valve 2CVS*93 cannot be full-stroke exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown and containment entry. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of

complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.5 Component Cooling Water System

4.5.1 Category C Valves

4.5.1.1 Relief Request. The licensee has requested relief from exercising RCP thermal barrier heat exchanger supply check valves 2CPP*289, 290, and 291 and containment instrument air compressors cooling water return check valve 2CPP*352 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of these valves, their safety position, at a refueling outage frequency when they are leak rate tested.

4.5.1.1.1 Licensee's Basis for Requesting Relief. "Valves are normally open; safety function is closed. Full-stroking closed cannot be performed during normal operation because these valves are located inside containment and are inaccessible. In addition, leak testing is required to verify closure of these valves, and if attempted at cold shutdown could delay plant startup. As an alternative, these valves will be leak rate tested and verified closed on a refueling outage frequency."

4.5.1.1.2 Evaluation. Valves 2CPP*289, 290, 291, and 352 cannot be exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown and containment entry. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.6 Main Steam System

4.6.1 Category C Valves

4.6.1.1 Relief Request. The licensee has requested relief from exercising main steam to auxiliary feed pump check valves 2MSS*18, 19, 20, 196, 199, and 352 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of these valves, the safety position, on a refueling outage frequency when they are leak rate tested.

4.6.1.1.1 Licensee's Basis for Requesting Relief. "Normally closed, safety function is to open for operation of the steam driven auxiliary feed pump and closed to prevent steam generator cross connection during a high energy line break. Full-stroking closed for these valves cannot be performed during normal operation because leak testing is required to verify full closure. In addition, leak testing if attempted at cold shutdown could result in a delayed plant startup. As an alternative, these valves will be leak rate tested and verified closed on a refueling outage frequency."

4.6.1.1.2 Evaluation. Valves 2MSS*18, 19, 20, 196, 199, and 352 cannot be exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.7.1 Category C Valves

4.7.1.1 Relief Request. The licensee has requested relief from exercising residual heat release reverse flow check valves 2SVS*80, 81, and 82 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of these valves, the safety position, on a refueling outage frequency when they are leak rate tested.

4.7.1.1.1 Licensee's Basis for Requesting Relief. "Valves are normally closed. Safety position is closed to prevent cross connection of steam generators during a high energy line break. Full-stroking closed for these valves cannot be performed during normal operation because leak testing is required to verify full closure. In addition, leak testing if attempted at cold shutdown could result in a delayed plant startup. As an alternative, these valves will be leak rate tested and verified closed on a refueling outage frequency."

4.7.1.1.2 Evaluation. Valves 2SVS*80, 81, and 82 cannot be exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. These valves are verified to open during cold shutdowns and refueling outages (see Appendix A, section 9.2 of this report). Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.8 Main Feedwater System

4.8.1 Category C Valves

4.8.1.1 Relief Request. The licensee has requested relief from exercising main feedwater header check valves 2FWS*28, 29, and 30 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of these valves, the safety position, on a refueling outage frequency when they are leak rate tested.

4.8.1.1.1 Licensee's Basis for Requesting Relief. "Valves are normally open. Safety position is closed for feedwater isolation in the event of a high energy line break. Exercising during power operation is not possible since this would require stopping feedwater flow to the steam generators, resulting in a plant shutdown. Leak testing is required to verify the valves are full closed because they have no position indication or weighted arms. In addition, the steam generators must be in wet layup with a nitrogen blanket established to perform this testing. Leak testing if attempted at cold shutdown could result in a delayed plant startup. As an alternative, these valves will be leak rate tested and verified closed on a refueling outage frequency."

4.8.1.1.2 Evaluation. Valves 2FWS*28, 29, and 30 cannot be exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.9 Auxiliary Feedwater System

4.9.1 Category C Valves

4.9.1.1 Relief Request. The licensee has requested relief from exercising auxiliary feedwater header check valves 2FWE*99, 100, and 101 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed verifying closure of these valves, the safety position, on a refueling outage frequency when they are leak rate tested.

4.9.1.1.1 Licensee's Basis for Requesting Relief. "Valves are normally closed. Safety function is to open during auxiliary feed system operation. Verification of full-stroke closed is not possible during power operation because this involves a leak test to be performed with the steam generators in wet layup and a nitrogen blanket established. In addition, leak testing if attempted at cold shutdown could result in a delayed plant startup. As an alternative, these valves will be leak rate tested and verified closed on a refueling outage frequency."

4.9.1.1.2 Evaluation. Valves 2FWE*99, 100, and 101 cannot be exercised during power operation or cold shutdown as the only method available to verify reverse flow closure is valve leak rate testing. These valves are verified to open during cold shutdowns and refueling outages (see Appendix A, section 11.1 of this report). Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown and cooldown. Procedures required for performance of leak rate testing during cold shutdown could delay plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.10 Service Water System

4.10.1 Category B Valves

4.10.1.1 Relief Request. The licensee has requested relief from exercising recirculation spray heat exchangers supply isolation valves 2SWS*MOV103A and MOV103B, in accordance with the requirements of Section XI, Paragraph IWV-3412 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.10.1.1.1 Licensee's Basis for Requesting Relief. "Valve is normally closed; safety function is to open to supply cooling water to the recirculation spray heat exchangers. Valve is not cycled during plant operation as failure of the valve in the open position would require plant shutdown. Failure of the valve in the open position at cold shutdown would delay plant startup. (The service water system cannot simultaneously support normal plant operation and the recirculation heat exchangers). As an alternative, these valves will be full-stroke exercised on a refueling outage frequency."

4.10.1.1.2 Evaluation. Valves 2SWS*MOV103A and MOV103B cannot be exercised during power operation or cold shutdown as stroking either valve to the open position would require plant shutdown and/or delay plant startup due to the service water system not being able to support normal plant operation and recirculation heat exchangers simultaneously. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown and/or delayed plant startup. Based on the impracticality of complying with the Code required testing frequency and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.10.2 Category C Valves

4.10.2.1 Relief Request. The licensee has requested relief from exercising main steam valve house cooling headers check valves 2SWS*1103 and 1104 in accordance with the requirements of Section XI, Paragraph IWV-3522 and has proposed to verify valve operability by full-stroke exercising these valves on a refueling outage frequency.

4.10.2.1.1 Licensee's Basis for Requesting Relief. "Valves are normally open; safety position is open to supply cooling water to main steam valve house cooling coils, and closed to prevent draining the inlet lines to the main steam valve house cooling coils during a service water pump trip on a loss of power. Full-stroking in the closed position cannot be performed during normal operation because isolation of the service water supply header in conjunction with a leak test is required to verify full closure. Isolation of the header is not acceptable because both service water headers are normally in service. In addition, leak testing if attempted at cold shutdown could result in a delayed plant startup. As an alternative, these valves will be full-stroked exercised on a refueling outage frequency."

4.10.2.1.2 Evaluation. Valves 2SWS*1103 and 1104 cannot be full-stroke exercised closed during power operation due to service water capacity requirements and these valves cannot be full-stroke exercised closed during cold shutdown as procedures required for performance of leak testing could delay plant startup. Conformance with the Code required testing method is impractical due to system design. Compliance with the Code required testing frequency would be burdensome since this would require quarterly plant shutdown and/or delayed plant startup. Based on the impracticality of complying with the Code required testing method, the burden to the licensee of complying with the Code required testing frequency, and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

4.11 Diesel Air Start System

4.11.1 Category B Valves

4.11.1.1 Relief Request. The licensee has requested relief from measuring the stroke time of emergency diesel generators air starting solenoid valves 2EGF*SOV202-1, SOV202-2, SOV203-1, and SOV203-2 in accordance with the requirements of Section XI, Paragraph IWV-3413 and has proposed to verify valve operability by measuring the time required for the diesel generators to achieve rated speed.

4.11.1.1.1 Licensee's Basis for Requesting Relief. "These valves are quick acting and do not have position indication. Operation of these valves will be monitored by timing the starting time to rated speed for each emergency diesel generator. Individual valves will be tested by isolating one bank of air prior to starting on an alternating frequency. This will insure each bank is capable of starting the emergency diesel generator in the required time and that the air starting solenoids are not degrading. As an alternative emergency diesel generator starting time will be measured monthly with a limiting stroke time based on response limit of the emergency diesel generator ready to accept load in equal to or less than 10 seconds."

4.11.1.1.2 Evaluation. Valves 2EGF*SOV202-1, SOV202-2, SOV203-1, and SOV203-2 cannot be stroke timed due to the lack of position indication. Alternating starting air banks will test individual valves and unsatisfactory stroke time of these valves will be indicated by the emergency diesel generator failing to reach rated speed in equal to or less than 10 seconds. Conformance with the Code required testing method is impractical due to system design. Based on the impracticality of complying with the Code required testing method and the licensee's proposed alternative testing, relief from the Code requirements may be granted as requested.

APPENDIX A

VALVES TESTED DURING COLD SHUTDOWNS

APPENDIX A

VALVES TESTED DURING COLD SHUTDOWNS

The following are Category A, B, C, A/C, and B/C valves that meet the exercising requirements of the ASME Code, Section XI, and are not full-stroke exercised every three months during plant operation. These valves are specifically identified by the owner in accordance with Paragraph IWV-3412 and 3522 and are full-stroke exercised during cold shutdowns and refueling outages. All valves in this Appendix have been evaluated and the reviewer agrees with the licensee that testing these valves during power operation is not possible due to the valve type and location or system design. These valves should not be full-stroke exercised during power operation. These valves are listed below and grouped according to the system in which they are located.

1. REACTOR COOLANT SYSTEM

1.1 Category B Valves

Pressurizer power operated relief valves 2RCS*PCV455C, PCV455D, and PCV456 should not be exercised during power operation since these valves have shown a high probability of sticking open and are not needed for overpressure protection during power operation. The NRC has concluded that routine exercising during power operation is "not practical" and, therefore, not required by IWV-3410.

The PORV's function during reactor startup and shutdown is to protect the reactor vessel and coolant system from low temperature overpressurization conditions and should be exercised prior to initiation of system conditions for which vessel protection is needed. The following test schedule is required:

a. Full-stroke exercising should be performed at each cold shutdown or, as a minimum, once each refueling cycle. In case of frequent cold shutdowns, testing of the PORVs is not required more often than once each three months.

b. Stroke timing should be performed at each cold shutdown, or as a minimum, once each refueling cycle.

c. Fail-safe actuation testing should be performed at each cold shutdown.

1.2 Category A/C Valves

Pressurizer relief tank nitrogen supply inside containment check valve 2RCS*68 and pressurizer relief tank water supply inside containment check valve 2RCS*72 cannot be exercised during power operation since full-stroke exercising can only be verified by cycling the weight loaded arm or leak testing, and the containment is not accessible. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

2. CHEMICAL AND VOLUME CONTROL SYSTEM

2.1 Category A Valves

Reactor coolant pumps seal water supply outside containment isolation valves 2CHS*MOV308A, MOV308B, and MOV308C and reactor coolant pumps seal water return inside and outside containment isolation valves MOV378 and MOV381 cannot be exercised during power operation because exercising these valves could result in damage to the reactor coolant pump seals. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Normal charging system makeup isolation valve 2CHS*MOV289 cannot be exercised during power operation as failure in the closed position will cause loss of pressurizer level control with subsequent plant shutdown. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

2.2 Category B Valves

Volume control tank outlet isolation valves 2CHS*LCV115C and LCV115E cannot be exercised during power operation because closure would isolate flow to the suction of the charging pumps, causing possible pump damage and the loss of pressurizer level control and subsequent plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Letdown isolation valves 2CHS*AOV204, LCV460A, and LCV460B and regenerative heat exchanger outlet isolation valve MOV310 cannot be exercised during power operation as failure in the closed position will cause loss of pressurizer level control and subsequent plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Charging pump recirculation isolation valve 2CHS*MOV373 cannot be exercised during power operation as failure in the closed position would isolate charging pump minimum flow to the volume control tank which could result in damage to the charging pump. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

Charging pump suction and discharge cross connect isolation valves 2CHS*MOV8130A, MOV8130B, MOV8131A, MOV8131B, MOV8132A, MOV8132B, MOV8133A, and MOV8133B cannot be exercised during power operation as these valves are required to be de-energized open by Technical Specifications. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

2.3 Category C Valves

Emergency boration line check valves 2CHS*136 and 141 cannot be exercised during power operation as this would result in concentrated boric acid being injected into the RCS causing an undesired reactivity transient and possible plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

2.4 Category A/C Valves

Reactor coolant pumps seal water supply inside containment isolation check valves 2CHS*474, 475, and 476 cannot be exercised during power operation because exercising these valves could result in damage to the reactor coolant pump seals. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Containment penetration X-19 thermal relief valve 2CHS*473 and charging header inside containment isolation check valve 2CHS*31 cannot be exercised during power operation since full-stroke exercising can only be verified by cycling the weight loaded arm or leak testing, and the containment is not accessible. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

3. RESIDUAL HEAT REMOVAL SYSTEM

3.1 Category A Valves

Reactor coolant system to residual heat removal system isolation valves 2RHS*MOV701A, MOV701B, MOV702A, MOV702B, MOV720A, and MOV720B cannot be exercised during power operation as they are interlocked closed to prevent overpressurization of residual heat removal system piping. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

3.2 Category B Valves

Residual heat removal heat exchanger bypass flow control valves 2RHS*FCV605A and FCV605B and residual heat removal heat exchangers flow control valves HCV758A and HCV758B cannot be exercised during power operation as local observation is required to determine valve stroking and valves are located inside the inaccessible containment. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

3.3 Category C Valves

Residual heat removal pumps check valves 2RHS*3 and 4 cannot be exercised during power operation as verification of closure requires local observation and the containment is inaccessible. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

4. SAFETY INJECTION SYSTEM

4.1 Category A Valves

High head safety injection to cold leg header isolation valve 2SIS*MOV836 and high head safety injection to hot leg header isolation valves MOV869A and MOV869B cannot be exercised during power operation as this would permit injection of relatively cold charging pump discharge into the reactor coolant system which would cause thermal shock to the injection nozzles possibly resulting in their premature failure. These valves will be full-stroke exercised during cold shutdown and refueling outages.

Low head safety injection to reactor coolant system hot leg outside containment isolation valve 2SIS*MOV8889 cannot be exercised during power operation as this valve is required to be de-energized closed by Technical Specifications. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

4.2 Category A/C Valves

Low head safety injection to hot and cold legs inside containment check valves 2SIS*130, 132, and 133 cannot be exercised during power operation as the low head safety injection pumps cannot develop enough head to overcome reactor coolant system pressure. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Safety injection accumulator fill inside containment check valve 2SIS*42 and high head safety injection to hot and cold legs inside containment check valves 83, 84, 94, and 95 cannot be exercised during power operation as these valves are located inside inaccessible containment and are verified to full-stroke exercise by observing the valve's weight loaded arm. These valves will be full-stroke exercised during cold shutdown and refueling outages.

5. QUENCH SPRAY SYSTEM

5.1 Category A Valves

Chemical injection to containment sump isolation valves 2QSS*SOV100A and SOV100B cannot be exercised during power operation as failure in the open position would cause loss of required sodium hydroxide injection for the quench spray system. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

5.2 Category A/C Valves

Quench spray system chemical injection inside containment check valve 2QSS*267 and quench spray header inside containment check valves 3 and 4 cannot be exercised during power operation as these valves are located inside the inaccessible containment and are verified to full-stroke exercise by cycling the valve's weight loaded arm. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

6. RECIRCULATION SPRAY SYSTEM

6.1 Category C Valves

Recirculation spray discharge to inside containment nozzle check valves 2RSS*29, 30, 31, and 32 cannot be exercised during power operation as these valves are located inside the inaccessible containment and are verified to full-stroke exercise by cycling the valve's weight loaded arm. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

7. COMPONENT COOLING WATER SYSTEM

7.1 Category A Valves

Component cooling water supply and return isolation valves 2CPP*MOV150-1, MOV150-2, MOV151-1, MOV151-2, MOV156-1, MOV156-2, MOV157-1, and MOV157-2 cannot be exercised during power operation because exercising these valves could result in damage to the reactor coolant pump seals. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

7.2 Category B Valves

Thermal barrier heat exchanger isolation valves 2CCP*AOV107A, AOV107B, and AOV107C cannot be exercised during power operation because exercising these valves could result in damage to the reactor coolant pump seals. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

8. MAIN STEAM SYSTEM

8.1 Category B Valves

Main steam isolation valves 2MSS*HYV101A, HYV101B, and HYV101C cannot be exercised during power operation as closure would result in plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

8.2 Category C Valves

Main steam to auxiliary feed pump check valves 2MSS*18, 19, 20, 196, 199, and 352 cannot be exercised during power operation as this would require injecting relatively cold auxiliary feedwater into the steam generators at design flow rate and this would result in thermal shock to the auxiliary feedwater piping possibly resulting in its premature failure. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

9. STEAM VENT SYSTEM

9.1 Category B Valves

Steam generators atmospheric dump isolation valves 2SVS*PCV101A, PCV101B, PCV101C, and HCV104 cannot be exercised during power operation as exercising these valves would exceed reactor plant full power limitations. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

9.2 Category C Valves

Residual heat release check valves 2SVS*80, 81, and 82 cannot be exercised during power operation as exercising these valves would exceed reactor plant full power limitations. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

10. MAIN FEEDWATER SYSTEM

10.1 Category B Valves

Main feedwater isolation valves 2FWS*HYV157A, HYV157B, and HYV157C cannot be exercised during power operation as this would stop feedwater flow to the steam generators resulting in plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

11. AUXILIARY FEEDWATER SYSTEM

11.1 Category C Valves

Auxiliary feedwater header check valves 2FWE*42A, 42B, 43A, 43B, 44A, 44B, 99, 100, and 101 cannot be exercised during power operation as this would require injecting relatively cold auxiliary feedwater into the steam generators at design flow rate and this would result in thermal shock to the auxiliary feedwater piping possibly resulting in its premature failure. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

11.2 Category B/C Valves

Auxiliary feedwater pumps discharge flow control/check valves 2FWE*FCV122, FCV123A, and FCV123B cannot be exercised during power operation as this would require injecting relatively cold auxiliary feedwater into the steam generators at design flow rate and this would result in thermal shock to the auxiliary feedwater piping possibly resulting in its premature failure. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

12. SERVICE WATER SYSTEM

12.1 Category B Valves

Service water headers isolation valves 2SWS*MOV106A and MOV106B cannot be exercised during power operation as failure in the closed position could result in damage to equipment cooled by the service water system and plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Secondary component cooling water heat exchanger isolation valves 2SWS*MOV107A, MOV107B, MOV107C, and MOV107D cannot be exercised during power operation as failure in the closed position would result in loss of train separation which would require plant shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Service water pumps discharge isolation valves 2SWS*MOV102A, MOV102B, MOV102C1, and MOV102C2 cannot be exercised during power operation if the idle service water pump is inoperable. These valves will be full-stroke exercised quarterly, when an inoperable service water pump is made operable, or at least during cold shutdown and refueling outages.

12.2 Category C Valves

Service water header check valves 2SWS*106 and 107 cannot be exercised during power operation as this would require all service water pumps to be shutdown. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

Service water pumps discharge check valves 2SWS*57, 58, and 59 and service water pumps vacuum breaker check valves 486, 487, and 488 cannot be exercised during power operation if the idle service water pump is inoperable. These valves will be full-stroke exercised quarterly, when an inoperable service water pump is made operable, or at least during cold shutdown and refueling outages.

13. FIRE PROTECTION SYSTEM

13.1 Category A/C Valves

Fire protection headers inside containment check valves 2FPW*382, 388, 753, and 761 cannot be exercised during power operation since full-stroke exercising can only be verified by cycling the weight loaded arm or leak testing, and the containment is not accessible. These valves will be full-stroke exercised during cold shutdowns and refueling outages.

14. CONTAINMENT INSTRUMENT AIR SYSTEM

14.1 Category A/C Valves

Instrument air header inside containment check valve 2IAC*22 cannot be exercised during power operation since full-stroke exercising can only be verified by cycling the weight loaded arm or leak testing, and the containment is not accessible. This valve will be full-stroke exercised during cold shutdowns and refueling outages.

15. CONTAINMENT VENTILATION SYSTEM

15.1 Category A Valves

Containment purge discharge and supply isolation dampers 2HVR*MOD23A, MOD23B, MOD25A, and MOD25B cannot be exercised during power operation as Technical Specifications require these dampers to be locked shut. These dampers will be full-stroke exercised during cold shutdowns and refueling outages.

APPENDIX B

P&ID LIST

APPENDIX B

The P&IDs and drawings listed below were used using the course of this review.

System	Drawing No.
Reactor Coolant System	10080-OM-206-1A 10080-OM-206-1B 10080-OM-206-1C
Pressurizer Spray and Relief System	10080-OM-206-2A
Chemical and Volume Control System	10080-OM-207-1 10080-OM-207-2 10080-OM-207-3A 10080-OM-207-3B 10080-OM-207-4
Reactor Plant Drain System	10080-OM-209-1
Residual Heat Removal System	10080-OM-210-1
Safety Injection System	10080-OM-211-1 10080-OM-211-2 10080-OM-211-4
Gaseous Nitrogen System	10080-OM-211-3 10080-OM-221-2
Leakage Monitoring System	10080-OM-212-1
Quench Spray System	10080-OM-213-2
Recirculation Spray System	10080-OM-213-1
Reactor Plant Sample System	10080-OM-214A-1A 10080-OM-214A-1B
Post Accident Sampling System	10080-OM-214C-1
Primary Plant Component Cooling Water System	10080-OM-215-1 10080-OM-215-2 10080-OM-215-3 10080-OM-215-4
Fuel Pool Cooling and Purification System	10080-OM-220-1
Main Steam System	10080-OM-221-1A 10080-OM-221-1C 10080-OM-221-1E

System	Drawing No.
Main Feedwater System	10080-OM-224-1A
Auxiliary Feedwater System	10080-OM-224-2
Steam Generator Blowdown System	10080-OM-225-1
Auxiliary Steam and Condensate System	10080-OM-227-2
Service Water System	10080-OM-229-4 1008^-OM-230-1 100Ɛ -OM-230-2 10080-OM-230-3 10080-OM-230-4
Water Fire Protection System	10080-OM-233-1A 10080-OM-233-3
Containment Instrument Air System	10080-OM-234-4
Service Air System	10080-OM-234-2
Diesel Fuel Oil System	10080-OM-236-9
Computer and Control Room Air Conditioning and Ventilation System	10080-OM-244A-2
Containment Area Ventilation System	100800-OM-244C-1
Post DBA Hydrogen Control System	10080-OM-246-1

APPENDIX C

IST PROGRAM ANOMALIES IDENTIFIED DURING THE REVIEW

APPENDIX C

IST PROGRAM ANOMALIES IDENTIFIED DURING THE REVIEW

Inconsistencies and omissions in the licensee's program noted during the course of this review are summarized below. The licensee should resolve these items in accordance with the evaluations, conclusions, and guidelines presented in this report.

1. Observation of lubricant level or pressure applies only to those pumps that have a lubrication system with level or pressure indication. For those pumps where this is not applicable, i.e. "greased for life" bearings or process fluid lubricated bearings, request for relief is not necessary and has not been addressed in this report.

2. Valve Relief Request No. 1 requests relief from Section XI testing for containment isolation valves and proposes to test these valves as per requirements in 10 CFR 50, Appendix J. The NRC staff position is that this is acceptable, however, the licensee must comply with Section XI, Paragraphs IWV-3426 and 3427 in order to obtain this relief (see section 4.1.1 of this report).

3. Valve Relief Request No. 10 requests relief from full-stroke exercising of the safety injection accumulator discharge check valves and proposes to partial-stroke these valves during refueling outages (see section 4.3.2.2 of this report). The NRC staff position is that check valve sample disassembly/inspection is a suitable alternative means to full-stroke exercise these valves, therefore, relief may be granted, provided that the licensee agrees to and implements check valve sample disassembly/inspection on a refueling outage frequency.

4. The licensee has requested relief from exercising the recirculation spray pumps quarterly with flow and proposes to jog these pumps dry quarterly. In its IST program description the licensee also proposes to test these pumps with flow during cold

shutdowns and refueling outages. However, the licensee later stated that flow testing could only be performed during refueling outages. During refueling outages, ample time should be available to install the extensive testing equipment necessary to test these pumps with flow (see section 3.2.2 of this report). The licensee should remove the reference to cold shutdown testing with flow as identified in the IST program.

5. Service water valves 2SWS*TCV101A and TCV101B should be included in the IST program as category B valves and tested to the Code requirements. It appears that these valves have been inadvertently excluded from the program (see question/reply 0.-10. of the Beaver Valley 2 trip report for the February 11 and 12 working meeting).

6. The following typographical errors were discovered during the review of the Valve Relief Request No. 1 containment isolation valve list:

   2SRR*SOVV128A-1 should be 2SRR*SOV128A-1
   2SWS*RV154-1 should be 2SWS*MOV154-1
   2SWS*RV155-1 should be 2SWS*MOV155-1
   2SWS*MOV155 should be 2SWS*RV155

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SEE INSTRUCTIONS ON THE REVERSE

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This EG&G Idaho, Inc. report presents the results of our evaluation of the Beaver Valley Power Station, Unit 2 Inservice Testing Program for pumps and valves that perform a safety-related function.

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